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Three months' withdrawal of growth hormone (GH) therapy from GH-deficient adults does not affect cognitive functioning

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Background

- Adults with untreated GH deficiency (GHD) may complain of poor cognitive functioning: difficulties in short and long-term memory, word-finding, concentration and decreased attention span[1].
- Some studies[2,3] have found improvement in cognitive functioning with GH treatment but others[4] no improvement.
- No known previous study has investigated effects on cognitive functioning of discontinuing GH treatment from GH-treated adults.

Objective

To determine the effect on cognitive functioning of discontinuation of GH treatment from adults with GHD.

Method

- Design: randomised double-blind placebo-controlled trial.
- GH-replacement therapy discontinued for 3 months from 12 of 21 adults, with 9 patients continuing on GH.
- Cognitive tests completed at baseline and end-point, except Test 8 (see Measures) completed once only.
- Semi-structured interviews plus questionnaires.

Measures

Criteria for selection of cognitive tests

- Cover main areas of cognitive functioning.
- Short.
- 2 equivalent forms available, or sufficient numbers of stimuli to split into two equivalent sets (Tests 1 and 4 below).

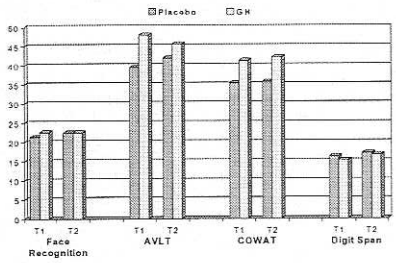
Cognitive tests

1 Warrington Recognition Memory Test[5]. (Visual recognition memory for faces and words).
2 Rey Auditory Verbal Learning Test[6] (AVLT). (Short-term memory, learning, delayed recall and executive function).
3 Trail making[7]. (Executive function and attention).
4 Graded Naming Test[8]. (Word-naming).
5 Benton Visual Retention Test[9]. (Visual recall).
6 Controlled Oral Word Association Test[10] (COWAT). (Executive function).
7 Digit span test, a sub-test of Wechsler Adult Intelligence Scale[11]. (Short-term memory).
8 National Adult Reading Test[12] (NART). (Pre-morbid intelligence).

Questionnaires included:

General Health Questionnaire[13] (GHQ), a measure of change in psychological well-being. Range 0-90.

Fig. 1: Some cognitive test scores at baseline (T1) and end-point (T2)



Results

Cognitive tests

- No significant between-group differences in pre-morbid intelligence
- No significant change (nor any trends in data) in either treatment group between baseline and end-point. (See Fig. 1 for a selection of test results: higher scores indicate better cognitive function).
- No significant between-group differences in scores at end-point when baseline scores had been partialled out.

Interviews

Three placebo- and 2 GH-treated patients reported perceived worsening of memory and concentration over the withdrawal period. Four of these 5 patients also reported increased depression (confirmed by scores on the GHQ, mean change of 23.5 +/- 14.2).

Conclusions

Some studies have reported negative effects of GHD on cognitive functioning, with improvements after GH-replacement therapy. The present study found no detrimental effects on cognitive functioning after discontinuation of GH treatment in GH-deficient adults. Patient reports of perceived poorer cognitive functioning in relation to untreated GHD may be associated with increased depression.

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